1. Background:

The Olympic National Park and Olympic National Forest largely occupy the Skokomish Watershed. It is the largest watershed in Mason County, and only 61,468 acres lie outside the National Park and National Forest boundaries. Long-term commercial forest represents the primary land use within the watershed. This classification covers 28,704 acres and accounts for 46.7 percent of the watershed's land that lies outside of the National Park and National Forest lands. The Skokomish Reservation is approximately 5,200 acres.

The Skokomish River watershed is located on the southeastern Olympic Peninsula in Washington State. The river system drains approximately 240 square miles. The river discharges into the southern portion of the Hood Canal basin of Puget Sound. Three main tributaries subdivide the drainage system: the South Fork, North Fork and Vance Creek. All three tributaries originate in the upper elevations of the Olympic Mountains.

- **Ecological integrity of the watershed.**

This watershed contains critical habitat for ESA-listed species, including Puget Sound Chinook, Bull Trout, and Orca Whales. The Skokomish River is the most frequently flooded river in Washington State. This river flows into Lower Hood Canal, which has recently been plagued by episodes of low dissolved oxygen that have resulted in massive fish kills.

In 1999, an effort began to clean-up bacteria in the Skokomish watershed. A group consisting of local jurisdictions, valley residents and state agencies developed a clean up plan. Through this process the Mason Conservation District developed a close partnership with local landowners in the watershed. In January 2005, Mason Conservation District and Ecology began a water quality study to evaluate progress on reducing bacteria concentrations to healthy levels. Some of the key improvements that have contributed to these reductions are almost 34,000 feet of riparian fencing, over 32,000 trees/shrubs planted; 60 acres enrolled in the Conservation Reserve Enhancement program (CREP).

The Skokomish Indian Reservation is located along the lower reaches of the Skokomish River. The river empties into Annas Bay, near the "elbow" of Hood Canal.

Annas Bay supports commercial and recreational shellfish harvest. In addition, the Skokomish Tribe harvests shellfish for ceremonial and subsistence purposes. The entire area is popular with fishermen, and the mainstem Skokomish River and lower Vance Creek are popular with swimmers during summer months. The watershed also provides habitat to a variety of wildlife including beaver, otter, deer, elk and waterfowl.

Problem Statement

The Skokomish River Basin is inundated with the invasive, non-native species Knotweed. This problem is getting more extensive and spreading quickly in places where we have previously not seen it. According to the Mason County Weed Board the age of the knotweed is ten plus years, patchy distribution with the patch's being extensive. The Skokomish watershed has Japanese, Bohemian, and Giant knotweed species.

Knotweed, listed as Class-B noxious weeds on Washington State's Noxious Weed List, is a perennial that can grow from seeds, rhizomes or stem pieces. In Washington State, the weed colonizes both upland and riparian areas. This plant is of specific concern in riparian areas as seasonal flood events expedite the spread of the species by washing stem fragments downstream to colonize more area. Each node of a stem can resprout to form an adult plant. Previously, adult plants were thought to send rhizomes out to a maximum of 25 feet, however, current field observations indicate that the rhizomes can reach much further.

Knotweed can invade and thrive in a variety of habitats, but in particular this alien species poses a significant threat to large swaths of riparian areas in Washington State. Certain riparian areas naturally exhibit poor soil characteristics that inhibit native plant growth and most native plant species are not well adapted to colonize these landscapes. Knotweed has evolved characteristics that aid the plant in exploiting riparian areas with poor soil and rapidly colonizing a stream or river systems once a population gains a foothold.

In the invasion of riparian areas is the range of reproductive mechanisms that plant has available. All of the knotweed reproductive pathways take advantage of the natural high water regimes of Washington State Rivers, thus transporting knotweed infestations to new locations.

Riparian areas act as natural migration and dispersion corridors for wildlife. Between 80 to 90% of Washington wildlife utilize riparian areas during some life stage. These areas also are important to the migration and fresh water life cycles of anadromous fish native to the northwest. Large woody debris is important to the rivers and streams of the Pacific Northwest. It creates pool habitats, retains spawning gravels, and provides cover for juvenile salmonids. The loss of large woody debris can disrupt natural processes, leading to channel incision, loss of side channel fish habitat, loss of pool habitat, decreased retention of spawning gravels, and decreased cover for juvenile salmonids and their prey. The reduction or modification of riparian vegetation is one cause of decreased large woody debris. Vegetation communities occupied by knotweed have lower species diversity compared to corresponding stands of uninvaded vegetation. Both deciduous and coniferous trees exhibit decreased juvenile populations in areas with high knotweed stem density, decreasing the number of individuals available to replace mature trees in the event of a disturbance.

Statewide Knotweed Control Program, 2006 Progress Report 3

Compared to native plant species, knotweed shows a decreased ability to control erosion despite having an extensive root system. During flood events, plant fragments

can be washed downstream where rhizome and stem pieces create new infestations. Erosion also increases sediment in streams. Increased sediment is a factor in the loss of productive salmonid habitat. Sediment can fill in the spaces between riverbed gravels that salmonids utilize for spawning and fill in pools used for rearing. It also negatively affects salmonids by smothering viable eggs, decreasing their feeding success, and damaging gill filaments.

Knotweed also affects aquatic invertebrates that compose the basis of the aquatic food chain. The food chain is disrupted by an alteration of the quality and timing of the leaf litter regime. This alteration changes nutrient inputs and soil composition. Invertebrates are the primary food source of juvenile fish species.

Limiting factors of salmonid production include elevated stream temperature, increased silt loads, poor riparian conditions, poor floodplain conditions, and a lack of large woody debris. Many of these protection or restoration projects could be impacted by knotweed infestation.

According to the Three-year watershed implementation priorities for Hood Canal Coordinating Council; it is a regional priority to control noxious weeds, including Knotweed.

Project Objectives:

By eradicating this knotweed we will restore native riparian vegetation in the stream buffers. This native riparian vegetation will improve fish habitat and wildlife habitat. By visually monitoring the treatment sites we should be able to see native vegetation returning to these areas and knotweed infestations eradicated. By eradicating knotweed and eventually re-planting native vegetation we hope to increase shade, provide a source of woody debris recruitment, and accomplish bank stabilization. Currently the knotweed that is present is not allowing native plants to grow and thrive. Through this proposal we hope to treat and inventory 50 river miles.

Project Approach:

a. The projects will take place on the mainstem of the Skokomish and its tributaries. Salmon live most of their life in the sea, but when they are mature and ready to breed, they enter fresh water to spawn, traveling to a stream. The female digs a nest in the gravel (called a redd) with her tail. She then pushes her thousands of eggs into the nest and the male milks the eggs, fertilizing them. The stream temperatures can adversely effect salmon Warm temperatures can reduce fecundity, decrease egg survival, retard growth of fry and smolts, reduce rearing densities, increase susceptibility to disease and decrease the ability of young salmon and trout to compete with other species for food and to avoid predation. The eggs hatch and grow: The newly-emerged salmon (called alevins) still have a food sac attached to them. When the food sac is used up, the salmon fry emerges from the nest - and must find food (like insects) for the first time. As the fry matures, it becomes camouflaged (with parr marks) and is called parr . When

it becomes silver-colored, it will be called a smolt. After growing for a while, the smolts swim downstream to the sea.

b. The Washington Native Plant Society conducted an inventory of non-natives species in the upper Skokomish watershed in 2006. From that survey they determined there are no infestations of knotweed species in the upper watershed. Currently infestations are confined to the lower watershed, without treatment that area could enlarge. Currently there are no activities in the Skokomish Watershed pertaining to knotweed removal. Mason Conservation District will administer this grant and will coordinate the project. The Mason County Weed Control Board and the Mason Conservation District will provide a licensed herbicide applicator to supervise Mason County trained crews for the plant eradication work. The Skokomish Tribal Department of Natural Resources and the Mason Conservation District will also monitor the lower watershed after the project to ensure project effectiveness.

c. N/A

d. This is a two year program request, our intent is to update the lower Skokomish knotweed inventory and treat several test plots. In the first year we will also inventory the Hamma Hamma and Lillawaup drainage. The second year of this grant will be used to do a total eradication in the inventoried areas. We are hoping to gain knowledge from the first year test plots to determine the best method of eradication.

e. The inventory will be conducted by staff walking the streams and GPS's the infested areas. In the first year we will select a few areas for treatment and apply herbicide or manual removal. In the second phase of eradication the Mason Conservation District will treat each river system starting at the headwaters and working downstream. This strategy prevents reinfestation of treated areas during frequent flood events in the Skokomish valley. Treatments will mainly be herbicide applications. Manual methods may be used in areas where the landowner prefers not to have any herbicides applied but will not be our recommended method. We expect to use four types of herbicide application to include injection of glyphosate, and foliar applications of triclopyr, glyphosate, and a glyphosate/ imazapyr mix. Since the majority of the knotweed infestation is in the riparian areas we will only use herbicide products registered for use in aquatic environments.

f. Most of the cost estimates were derived from the statewide knotweed control program, 2006 Progress Report. We researched past funded knotweed removal projects and estimated by areas to be inventoried and treatment.

g. The Mason Conservation District has utilized the CREP program to spot clear knotweed infestation by manually removing in enrolled properties. We hope with this funding that we can take a holistic approach to the watershed and treat all infestations.

The issue with spot treating areas is that the next flood season all the seed sources wash back in and take hold once again.

h. The Mason Conservation District will partner with the Skokomish Indian Nation and the Hood Canal Salmon Enhancement Group (HCSEG). The Skokomish Indian Nation will update the inventory on tribal lands and also do treatment techniques on those properties. The HCSEG will act as a project partner in the Union River drainage we hope to utilize each others lessons learned and trained crews.

i. This project is going to enlist all residents on effected lands .The Mason Conservation District plan is to utilize the staff that has a close relationship with the citizens in this watershed.

j. Plan for monitoring the success of eradication work. With this grant we should have a large number of cooperators and will depend on them to survey their property regularly and notify and retreat if they notice any new knotweed. Strategy to prevent the reinfestation of the project area. Cooperation and coordination between groups will be a huge learning factor in controlling knotweed and improving the effectiveness of knotweed control and eradication on a large scale. If funded, it is the districts hope to gain current knowledge from lessons learned from other groups actively removing knotweed successfully. We hope to re-survey the watershed following the initial treatment and re-treat any new growth. Continue to survey the watershed and conduct public education activities. Follow up on any sightings that occur as a result of the public education campaign.

k. Shannon Kirby will be the technician dedicated to this project has been a technician for over ten years with the Mason Conservation District. She has been working with Skokomish Watershed landowners for eight years and has solid knowledge of the land as well as a great rapport with the Skokomish Tribe, local agencies and property owners. Shannon was the Chairperson for the writing of the Detailed Implementation Plan for the Skokomish Watershed. Through all these efforts she works very closely with the residents in the Skokomish Valley and just conducted an updated inventory in the Skokomish watershed in 2004. She is currently working with several landowners who are very interested in removing the knotweed from their property. We feel the district's non-regulatory status will allow us to obtain permission to get on private properties. The Skokomish Tribe is willing to lend a boat so we can float parts of the river system to inventory knotweed infestations. We will also utilize the expertise of Marshall Udo from the Washington State Department of Agriculture to provide technical assistance.

l. The Mason Conservation District and the Skokomish Tribe feels that we need to deal with this problem immediately, it has been left to thrive on its own for over eight years without any treatment and is taking over much of the riparian areas. Staff has also

noted knotweed taking over in areas where we have done riparian restoration work. The Hamma Hamma and Lilliwaup drainages are an unknown for knotweed infestations; hopefully we can inventory and treat any areas before it takes over.

m. We feel from past eradication studies in other areas, that if done correctly we can remove knotweed from the treatment area and eventually replant the riparian areas with native vegetation.

5. Project timeline:

July 1st 2008 – August 20th 2008-update inventory in the Skokomish Watershed. Mason Conservation District will inventory the Skokomish Valley and the Skokomish Indian Nation will inventory the Skokomish Indian Reservation. During the inventory we will walk or float with GPS units mapping and flagging infestations. We will take the GPS points and create a GIS layer detailing infestations throughout the watershed. Some treatment will be conducted during this time by mowing and spraying on the roadside.

August 20th –October 20th 2008 -. Treat knotweed using four types of herbicide application to include injection of glyphosate, and foliar applications of triclopyr, glyphosate, and a glyphosate/ imazapyr mix. We will treat knotweed until the first frost.

October-December 2008 create an end of season report, prepare for the upcoming season and update the GIS layer with areas treated.
February - March 2009- we will hold two workshops educating the public about knotweed and what they can do to identify and control it on their property.
The second workshop will be held in Brinnon, Hoodsport area to promote knotweed removal. March- grant end- Treat all known knotweed areas- Conduct final report and create maps detailing treatment areas.

6. Late or early season flooding may hamper efforts. We will continue as soon as water levels recede.